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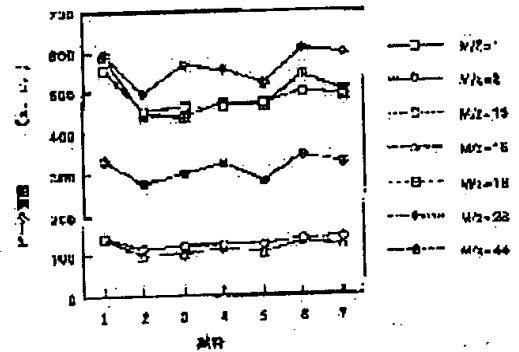
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HOLD-BACK AGENT FOR MATERIAL TO BE WORKED AND INSTALLING AND REMOVING MATERIAL TO BE WORKED USING THE SAME

Abstract:

PROBLEM TO BE SOLVED: To obtain a hold-back agent for a material to be worked capable of stably tacking and fixing the material to be worked to a surface plate of a grinding machine with a high accuracy when grinding the material to be worked and readily peeling the material to be worked when peeling thereof from the surface plate of the grinding machine without requiring the conventional washing with a solvent or a surfactant and provide a method for installing or removing the material to be worked using the hold-back agent.

SOLUTION: This hold-back agent for a material to be worked comprises a polymer composition containing a polymer having the primary melt transition occurring over a narrower temperature range than about 15°C. A side chain crystallizable polymer is present in only an amount sufficient to make the polymer composition nearly nontacky at a temperature below ambient temperature and tacky at a temperature above that in the polymer composition.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention -- ground members, such as a semiconductor wafer and precision glass, -- surface plates, such as a grinder, -- holding -- polish processing -- carrying out -- hitting -- the polish-ed -- it is related with the method of equipping the surface plate of a grinder with the hold-back agent for the hold-back agent used for maintenance of a member and this wafer for polish, precision glass, etc.

[0002]

[Description of the Prior Art] In recent years, in the semiconductor industry, the degree of integration of IC increases by leaps and bounds, and 4M, 16M, and a further are under advance to 64M.

[0003] Under such a situation, the demand to improvement in the quality on the front face of a wafer which is the base of IC has been increasing increasingly. chemical and electric -- although a character is also a natural thing, in order to raise the degree of integration of IC, it is necessary to narrow the minimum line width which constitutes the device prepared on a wafer for example, and a demand is becoming high from the line breadth of 0.5 microns to 0.35 microns. If possible, in order to close such high definition processing, the demand to the flat nature, i.e., the thickness precision, on the front face of a wafer is becoming still stronger physically. That is, 0.2 micron or less ** is increasingly required for the thickness different (Local thickness variation) (LTV) covering 20mm square [from which the thickness different (Total, thickness variation) (TTV) covering a whole surface product in the wafer after the last mirror-finish polish should become 1 micron or less and one IC chip].

[0004] In order to attain this precision prescribe, in the polish process of a wafer, it is necessary to equip the surface plate of a grinder with a wafer in parallel with a surface plate side correctly.

[0005] Generally for equipping a grinder surface plate with a wafer, the wax is used. this method applies the wax which heated the surface plate and was fused on the front face, and fixes a wafer to a surface plate side through this -- making -- polish work -- carrying out -- after polish processing -- again -- a surface plate -- heating -- a wax -- dissolving -- a wafer -- removing -- the organic solvent -- with, it washes and the adhering wax is removed

[0006] a heat process called heating melting of a wax although the thickness different of a polish wafer is satisfied for them since there are few these methods -- fault ***** of ** which the organic solvent detrimental for existence of like and washing removal of the wax from a wafer front face is used so much, and it will imprint [*****] as a dimple on the front face of a wafer, and will worsen the workmanship state of polish while those existence grinds if a gelling object and visitor dust are contained in the wax. Moreover, the fault of *****ing delicately also had a wafer front face by this washing.

[0007]

[Problem(s) to be Solved by the Invention] this invention fixes workpieces, such as the above-mentioned wafer and precision glass, to a grinder surface plate. And solve the trouble at the time of exfoliating from a grinder surface plate, and the purpose carries out adhesion fixation of the workpiece with high

precision and stably at a grinder surface plate at the time of polish. In case it exfoliates from a grinder surface plate, if it is ablation, it closes easily, and it is in offering the desorption method of a workpiece using the hold-back agent for workpieces and this hold-back agent which moreover do not need washing by the conventional organic solvent or a conventional surfactant.

[0008]

[Means for Solving the Problem] The hold-back agent for workpieces of this invention consists of the polymer constituent containing polymer with the first melting transition which takes place over a temperature requirement narrower than about 15 degrees C, and the above-mentioned purpose is attained by that.

[0009] It is desirable that only sufficient amount for the polymer which can be side-chain crystallized to make it non-adhesiveness at the temperature below a room temperature, and make this polymer constituent adhesiveness at the temperature above it mostly exists in the above-mentioned polymer constituent.

[0010] The fundamental composition of such a hold-back agent for workpieces is indicated in JP,5-47392,B.

[0011] Moreover, the desorption method of the workpiece of this invention applies the above-mentioned hold-back agent for workpieces to either, even if there are few grinder surface plate tops of temperature T1 and workpieces. This workpiece is stuck on this grinder surface plate in this hold-back agent, it is characterized by removing this workpiece from on this grinder surface plate by cooling this hold-back agent from the aforementioned temperature T1 to the low temperature T2 after grinding this workpiece, and the above-mentioned purpose is attained by that.

[0012]

[Embodiments of the Invention]

(Hold-back agent for workpieces) The polymer constituent containing polymer with the first melting transition which takes place over the temperature requirement narrower than about 15 degrees C used for this invention It is what is indicated in a Japanese patent application official announcement common No. 507425 [four to]. to this polymer constituent Only sufficient amount to show the property which makes it non-adhesiveness at the temperature below a room temperature, and makes adhesiveness the hold-back agent by which the polymer which can be side-chain crystallized is constituted from this polymer constituent at the temperature above it mostly exists.

[0013] As an embodiment of the polymer constituent which constitutes this hold-back agent, it is the U.S. Run deck RABUZU It is suitable to use the polymer which can be principal chain crystallized, and these are that side-chain crystallization currently sold from in condominium rhe TEDDO is possible, and a thing containing the polymer which shows a temperature dependence adhesion property. The polymer which may be used for this polymer constituent and which can be crystallized may contain both that side-chain crystallization is possible and the polymer which can be principal chain crystallized. The compound of the former class is that crystallization of a difference is enabled for the latter class by the skeletal structure including the side-chain portion which can be crystallized.

[0014] A term called the "melting point" or the "first transition" used on these specifications means the temperature from which the specific portion of the polymer adjusted by the orderly array at first will be in a disordered state according to a certain balanced process. The term a "freezing point" means the temperature at which this particular part of the polymer which was a disordered state at first is adjusted by the orderly array according to a certain balanced process. In the one embodiment, it is desirable, the first transition temperature or the melting point of polymer is desirable to the range of about 20 to 35 degrees C, and a pan, and it is the range of about 25 to 30 degrees C. The rapid namely, thing smaller than about 10 degrees C to happen in a desirable comparatively narrow temperature requirement smaller than about 5 degrees C is suitable for melting. The polymer constituent is equipped with the polymer in which an adhesive property is lost by adding a simple cooling method, for example, ice, an ice bag, etc. In other embodiments, polymer has a point freezing [low] (namely, "crystallization") preferably [it is desirable and] from the workpiece temperature of the range of about 15 to 25 degrees C in the range of about 10 to 28 degrees C, and a pan. It is also suitable that polymer crystallizes quickly. A seeding

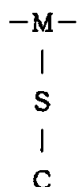
agent, i.e., a crystallization catalyst, can be mixed in the polymer which offers rapid crystallization dynamics about this point. In this embodiment, it becomes very easy from a workpiece to exfoliate a hold-back agent. After use may exfoliate easily, without attaching an unjust blemish to a workpiece by cooling merely more simply [small low temperature] than a service temperature.

[0015] Polymer is an equivalent on the function of the polymer which is the range of 250,000 to 1,000,000dalton and which can be crystallized, or the polymer [20,000 / about / 100,000 / 1,300,000dalton of 2,300,000dalton of weight average molecular weight] typically which can be crystallized preferably. By the polymer which is "the equivalent on a function" of the polymer for this invention which can be crystallized, the polymer which shows an above-mentioned temperature dependence adhesion property is included. The polymer chosen in order to mix in a polymer constituent has the monomer which offers a desirable phase transition temperature, bonding strength, and a constituent with adhesiveness and which changes with embodiments. A polymer constituent may be prescribed so that it may state here again and the mixture of two or more different polymer may be contained.

[0016] The polymer which is also called "pectinate" polymer and which can be side-chain crystallized is known well, and is marketed. These polymer is J.Polymer Sci. : It is reviewed in Macromol.Rev.8:117-253 (1974). This indication is used for as reference in this specification.

[0017] Generally, these polymer contains the monomer unit X of the following formula.

[0018]



M is [a spacer unit and C of a skeleton atom and S] the bases which can be crystallized among a formula. these polymer -- usually -- at least -- about 20J/g -- it has the about 40J [/g] heat of fusion (**Hf) at least preferably Polymer contains a 50 to 100wt(s)[which is expressed by "X"].% monomer unit. When polymer contains X fewer than 100%, the monomer unit which may be expressed by "Y", "Z", or its both is contained further. here -- Y -- X and/or Z -- a polymerization -- it is the mixture of the monomer of polar [-izing / polar], or non-polar, or the monomer of polar or non-polar, and Z is the mixture of the monomer of polar or non-polar The monomer of these polarity, for example, polyoxyalkylene, the acrylate containing hydroxyethyl acrylate, an acrylamide, and methacrylamide increase an adhesive property to almost all base materials typically.

[0019] The skeleton ("M" defines) of polymer may include spacer combination which it may be the organic structures (an aliphatic or aromatic hydrocarbon, ester, the ether, amide, etc.), may be the inorganic structures (SURUFAIDO, phosphagen, silicon, etc.), and is a suitable organic or inorganic unit, for example, ester, an amide, a hydrocarbon, a phenyl, the ether, or an ion salt (for example, carbo KISHIRU-alkylammonium, a sulfonium, a phosphonium ion pair, or

[0020] Although side chains ("S" and "C" define) may be aliphatic series, aromatic series or aliphatic series, and an aromatic combination, it can go into a crystallized state. As a usual example, it is the aliphatic side chain of the alignment of at least ten carbon atoms, C14-C22 [for example,]. There are acrylate or methacrylate, an acrylamide, vinyl ether or ester, a siloxane or an alpha olefin, a fluoridation aliphatic side chain of at least six carbon, and a p-alkyl styrene side chain which an alkyl becomes from eight to 24 carbon atoms.

[0021] The length of a side-chain portion is usually size from 5 times of the distance between the side chains in the case of acrylate, methacrylate, a vinyl ester, an acrylamide, methacrylamide, vinyl ether, and an alpha olefin. In the case of mutual polymer with the butadiene of fluoro acrylate of being extreme, a side chain may be twice [only] the length of the distance during branching. Anyway, a side-chain unit forms a desirable portion [than 50%] with larger capacity with the larger capacity of polymer

than 65%.

[0022] As a specific example of the monomer which can be side-chain crystallized J.Poly. Sci. 10:3347 (1972) and J.Poly. Sci. 10:1657 (1972), J.Poly. Sci. 9:3367 (1971) and J.Poly. Sci. 9:3349 (1971), J.Poly. Sci. 9:1835 (1971) and J.A.C.S. 76:6280 (1954), J.Poly. Sci. 7:3053 (1969), acrylate given in Polymer J. 17:991 (1985), Fluoro acrylate, methacrylate, and vinyl-ester polymer, An acrylamide, a corresponding substitution acrylamide, and corresponding maleimide polymer (J.Poly. Sci.:Poly. Physics Ed. 18:2197 (1980)), J.Poly. Sci.: Poly (alpha olefin) polymer, such as a thing given in Macromol. Rev. 8:117-253 and (1974) Macromolecules 13:12 (1980), Poly alkyl vinyl ether, such as a thing given in Macromolecules 13:15 (1980), Alkyl phosphazene polymer, such as a thing of poly alkyl ethylene oxide, Poly. Sci. USSR 21:241, and Macromolecules 18:2141 publication, The poly isocyanates, such as a polyamino acid and a thing given in Macromolecules 12:94 (1979), A thing given in Macromolecules 19:611 (1986) etc., The polyurethane prepared by making an amine or an alcoholic content monomer react with a long-chain alkyl isocyanate, p-alkyl styrene polymer, such as a thing of a publication, is in polyester and a polyether, a polysiloxane, polysilane, J.A.C.S. 75:3326, and (1953) J.Poly. Sci. 60:19 (1962).

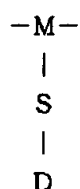
[0023] Although it can moreover crystallize by polarity comparatively, as for the polymer which is not influenced by moisture, the portion used as a crystal has a specific use. For example, if a polyoxyethylene, polyoxypropylene, a polyoxy butylene, or a KOPORI oxy-alkylene unit is mixed in polymer, polymer will serve as polarity more and will raise adhesion to the damp workpiece.

[0024] In a suitable embodiment, -C is especially chosen from the group which consists of -(CH₂)_n-CH₃ and -(CF₂)_n-CF₂H on these specifications in the above-mentioned structure. n is an integer containing 8 and 20 from 8 to 20 here, -S- is chosen from the group which consists of -O-, -CH₂-, -(CO)-, -O(CO)-, and -NR-, and R is hydrogen or a low-grade alkyl here. (1-6C) And -M- is -[(CH₂)_m-CH]-, and m is 0 to 2 here.

[0025] The typical "Y" unit is the monomer of the alkyl of alignment or the letter of branching, allyl-compound acrylate or methacrylate, an alpha olefin, alignment, the letter alkyl vinyl ether of branching or a vinyl ester, mallein ester or itaconic-acid ester, an acrylamide, styrene or substitution styrene, an acrylic acid, a methacrylic acid, and a hydrophilic property. These are explained by above-mentioned WO 84/0387 in full detail.

[0026] The following monomer structure is added into polymer, or it may be made to exist instead in addition to an above-mentioned monomer unit "M-S-C."

[0027]



or [that "D" is the polyether chain of hydrophilic properties, such as polyoxyalkylene chain (for example, polyoxyethylene), and it may crystallize in contrast with "C"] -- or it must have been carried out "D" has desirable molecular weight higher than about 100dalton.

[0028] In order to clarify transition between adhesiveness and a non-adhesiveness state, I hear that it must choose the stereoregularity of polymer carefully that it is important in the case of the polyolefine which may exist with two or more stereoregularity gestalten, and there is. Although polymer may exist in a single configuration, i.e., atactic one, and syndiotactic one or isotactic either, unless the melting point is in agreement by chance, it cannot exist as mixture of a stereoregularity object. By having the mixture of the polymer of various stereoregularity of the different melting point, the width of face of transition spreads and the polymer obtained as a result brings a result which shows a loose change of an adhesion property in a narrow temperature requirement.

[0029] The polymer of a suitable principal chain which can be crystallized contains water-soluble

polyalkylene-oxide and low-grade alkyl polyester and the poly tetrahydrofuran.

[0030] Cross linkage of any polymer of a side chain or a principal chain which can be crystallized may be carried out, or it must have been carried out. The same with the polymer of the amount of macromolecules being used for carrying out cross linkage of the polymer constituent, usually, the flow of melting decreases and an adhesion strength increases from the matter of the low molecular weight which does not carry out cross linkage. Since a polymer constituent may be used at temperature higher than the melting point of polymer, thereby, the flow of melting does not move by the smaller one being desirable, and does not flow, or a hold-back agent does not shift to a base-material front face. (Namely, in contrast with the conventional "hot-melt" adhesives). Therefore, the polymer constituent which has sufficient adhesion strength so that it may not fail to adhere is desirable. The flow of low melting and a suitable adhesion strength may be attained by other meanses, such as attracting cross linkage by use of a known method before addition of a suitable comonomer (for example, high Tg monomer), or manufacture of a hold-back agent, during manufacture, or after manufacture, in block copolymerization or other fields concerned.

[0031] Various methods can be used for generating the matter by which cross linkage was carried out and which can be crystallized. A network copolymer may be prepared by carrying out the polymerization of the monomer which can be crystallized, and the polyfunctional monomer in either one stage or two stages. 1 stage process may be formed in a proper place in a hold-back agent, and on the other hand, 2 stage process is used, when a middle processing stage is required. Various polyfunctional monomer (2, 3, a polyfunctional acrylic acid or a methacrylic ester, vinyl ether, ester or an amide, an isocyanate, an aldehyde, epoxy, etc.) is known for the field concerned. These polyfunctional monomers may be used by the result of a request in one stage or 2 stage process. In order to carry out cross linkage of the polymer which was beforehand formed without having added the copolymer or adding and which can be crystallized, ionization radiation, for example, a beta, or gamma radiation, a peroxide, a silane, or the same curing agent can be used. Ion cross linkage may be formed by generating the complex which for example, an acid polymer site is made to react with 2, a trivalent metal salt, or an oxide, and works as a cross linkage site. An organic salt or a complex may be similarly prepared by the method known in the field concerned.

[0032] If cross linkage of the matter is carried out to a superfluous grade, crystallinity and/or adhesiveness can decrease to the point that a desired temperature activity property is lost. In order to optimize an above-mentioned factor, cross linkage should be the range of .05 to 1 mole percent preferably from about 0.01% to five mole percents. The polymer by which cross linkage was carried out usually has preferably about 20J /of at least 30J [g] heat of fusion g at least.

[0033] Effective cross linkage may be acquired also by the physical method. For example, a part for part II which shows glass transition or the melting point higher than the block copolymer containing the portion which can be crystallized, and the polymer which can be crystallized is prepared, and although total mass is higher than the melting point of the polymer which can be crystallized, physical stability is indicated to be a low in time from transition of the 2nd polymer.

[0034] As mentioned above, it is desirable that a prescription may be written with the mixture of the polymer chosen so that a polymer constituent might happen in the desirable range narrower than about 10 degrees C with the first melting transition of this constituent narrower than about 15 degrees C, or polymer again. It is also suitable that melting transition takes place between about 5 degrees C and about 50 degrees C. Furthermore, a constituent needs to return to a non-adhesiveness state, if temperature falls by at least 2 or 3 degrees C from the melting range, without adhesiveness's appearing within a little less than 1 minute, next making any base materials contact, when it goes up beyond the melting range. The time which this reversion takes needs to be shorter than about 5 minutes. The latter adhesive value (PKI) is the minimum value of a low or adhesive measuring instrument from about 25 g-cm / second preferably.

[0035] In addition to one or more above-mentioned polymer, a useful polymer constituent may contain the conventional additives, such as a bulking agent of a tackifier, antioxidants (rosin of a tree, polyester, etc.), a fiber, or a non-fiber, and a colorant, here. Moreover, when an overall temperature induction

property is not influenced intentionally, it is possible to also make adhesives contain further. It is suitable for the amount of the polymer in a polymer constituent which can be crystallized that it is about 40 to about 100% of the weight of a range.

[0036] In order to carry out the coat of the temperature activity polymer constituent to a workpiece, it can carry out by many methods, such as spray deposition, paint, being immersed, gravure, and rolling. A polymer constituent may be applied by the same method as the case of decalcomania by the imprint from a release sheet again. A constituent may be applied as a suitable solvent, an emulsion, or a latex as it is. A suitable monomer and a suitable additive are directly applied to a base material, and heat, radiation, or these other suitable contractors may harden by the known method on that spot.

[0037] (The desorption method of a workpiece) In equipping a grinder surface plate with a workpiece using the hold-back agent of the above-mentioned composition, it can carry out as follows, for example.

[0038] Clarification of the grinder surface plate is removed and carried out first, and a hold-back agent is applied to a surface plate in a spin coater, or a hold-back agent is similarly applied to a workpiece by the spin coater in a plate-like workpiece. Subsequently, it is stuck by pressure, warming both or one side at about 35-50 degrees C. Under the present circumstances, when a workpiece is a semiconductor wafer, it is desirable to pressurize so that a hold-back agent may be incurvated lightly and a workpiece may be previously contacted from a center section.

[0039] warming -- a method can be performed by spraying the warm air which irradiates infrared radiation, or putting warm water in an infrared heater etc. You may arrange workpieces, such as a wafer with which the hold-back agent adhered to the warm temperature machine etc.

[0040] In case a workpiece is removed after presenting a grinder surface plate with a workpiece by the above methods and processing a workpiece, by cooling about about 5 degrees C of these hold-back agents from ordinary temperature at least, i.e., considering as about 20 degrees C, the adhesive property of the hold-back agent of the temperature activity attached in the workpiece falls quickly, and peel strength falls [inch] in about 0.1kg /or less, and can exfoliate a workpiece from a surface plate side easily. At this time, survival of the hold-back agent to a workpiece is an undetectable grade. In order to cool, it can carry out by pouring cold water, spraying cold blast, etc.

[0041] The polymer constituent containing the polymer which shows such a temperature dependence adhesion property can be used also for the hold-back agent at the time of polish processing of a lens, prism, and other precision polish glass, and is beforehand applied to uniform thickness thinly at other thin sheet base materials, may remove a sheet base material from a polymer constituent, and may carry out adhesion fixation of this polymer constituent at a workpiece.

[0042] thus, when a workpiece is stuck on a surface plate using the hold-back agent (temperature activity pressure-sensitive hold-back agent) containing the polymer which shows a temperature dependence adhesion property, as compared with the case where a conventional wax or a conventional pressure sensitive adhesive is used, washing after a polish work end is markedly alike, it becomes easy, and the quality of the processing side can also be boiled markedly and can be raised

[0043]

[Example]

(Example 1) The spin coater was directly used for the 8 inches silicon wafer, and the thickness of 0.20 microns was coated with the temperature activity pressure-sensitive binder (viscosity of 10cps, 10% of solid contents) by the run deck company, and it was made to stick to the top board made from a ceramic of a grinder (ceramic carrier) by pressure. The adhesion temperature at this time was 35 degrees C. Then, the wafer was processed on the processing conditions of Table 1. The pure water cooled at about 10 degrees C was poured on the wafer stuck on the ceramic carrier for 5 minutes after the polish end, and the wafer was exfoliated from the ceramic carrier. Then, although the residue of the organic substance of this wafer side was measured according to the below-mentioned TDS method, the organic substance was undetectable at all.

[0044] (Example 2) The spin coater was directly used for the ceramic carrier of a grinder, the thickness of 0.20 microns was coated with the temperature activity pressure-sensitive binder (viscosity of 10cps, 10% of solid contents) by the run deck company, and the SHIRIKO wafer was made to stick by

pressure. The adhesion temperature at this time was 35 degrees C. Then, the wafer was processed on the processing conditions of Table 1. The pure water cooled at about 10 degrees C was poured on the wafer stuck on the ceramic carrier for 5 minutes after the polish end, and the wafer was exfoliated from the ceramic carrier. Then, although the residue of the organic substance of this wafer side was measured according to the TDS method, the organic substance was undetectable at all.

[0045] (Example 1 of comparison) an example 2 -- the same -- a semiconductor wafer -- service water -- the spin coater was directly used for the ceramic carrier of a grinder, the thickness of 0.20 microns was coated with the solubility wax (viscosity of 10cps, solid-content 10%), and the SHIRIKO wafer was made to stick by pressure. The adhesion temperature at this time was 80 degrees C. Then, the wafer was processed on the processing conditions of Table 1. Although the wafer stuck on the ceramic carrier was exfoliated after the polish end using the pick, pure water washed the wafer and the residue of the organic substance of a wafer side was observed, the remainder of a wax was observed visually and washing of the organic solvent was needed.

[0046] (Example 3) The temperature activity pressure-sensitive binder (viscosity of 90cps, 30% of solid contents) by the run deck company was applied to the prism made from direct BK7 (20mmx20mm), and was made to stick to the top board of a grinder by pressure. The adhesion temperature at this time was 35 degrees C. Then, prism was processed on the processing conditions of Table 2. Cooled about 10-degree C pure water was poured on the prism stuck on the top board for 5 minutes after the polish end, and prism was exfoliated from the top board. then, light-transmittance measurement of this prism -- although carried out, the light transmittance was high enough

[0047] (Ratio example of school 2) The commercial rosin wax (viscosity of 100cps, 50% of solid contents) was applied to the prism made from direct BK7 (20mmx20mm), and was made to stick to the top board of a grinder by pressure. The adhesion temperature at this time was 100 degrees C. Then, prism was processed on the processing conditions of Table 2. The prism stuck on the top board was warmed after the polish end, and prism was exfoliated from the top board. Then, when the light transmittance of this prism was measured, the wax had adhered so much, and the light transmittance was very low and needed washing.

[0048]

[Table 1]

研磨機	スピードファム片面磨機59SPA W
加工ウエハ	シリコン単結晶P (100) ウエハ8インチ径
研磨クロス	SUBA800
研磨スラリー	NALCO2850 20倍希釈品
加工圧力	300g/cm ²
スラリー流量	1000ml/min
加工時間	80min

[0049]

[Table 2]

研磨機	スピードファム片面磨機 26B
被加工物	プリズム (BK7製、20mm×20mm)
研磨クロス	MH C14A-15
研磨スラリー	酸化セリウム ミレックス 20wt%
加工圧力	150g/cm ²
スラリー流量	500ml/min 循環させ使用
加工時間	20min

[0050] (Example 4) Next, the measurement result by the TDS (Thermal Desorption Spectroscopy) method about [to the wafer by the hold-back agent which consists of a polymer constituent] contamination is shown.

[0051] A. The monomer composition, reduction toluene, and azobisisobutyronitrile below manufacture of a hold-back agent were mixed, it heated at 60 degrees C among nitrogen-gas-atmosphere for 12 hours, polymer was prepared, and it considered as the hold-back agent.

[0052] Hold-back agents 2-5 use dodecyl hexyl acrylate / hexyl acrylate / acrylic acid, and the weight ratio is as follows.

[0053] A hold-back agent 6 uses dodecyl hexyl acrylate / methyl acrylate / acrylic acid, and the weight ratio is as follows.

[0054] A hold-back agent 7 uses dodecyl hexyl acrylate / hexyl acrylate / acrylic-acid hydroxyethyl, and the weight ratio is as follows.

[0055]

(1) the blank (2) hold-back-agent 2:78.6/14.4/7(3) hold-back-agent 3:82/15/3(4) hold-back-agent 4:82/15/3(5) hold-back-agent 5:80.3/14.7/5(6) hold-back-agent 6:75/20/5(7) hold-back-agent 7:80.3/14.7/5B. above-mentioned hold-back agents 2-7 were applied to the rear face of a wafer, and samples 2-7 were produced As a blank sample, it ground by ***** which used the template blank by Rodel Nitta CO.

[0056] C. The lower lapping plate of a grinder was equipped with the above-mentioned sample, and it was ground on condition that the following. Then, the polished wafer was immersed into 5-degree C pure water, and the hold-back agent was solidified. This hold-back agent was stripped off by the hand from the wafer side. Subsequently, on visual level, it washed with water so that a hold-back agent might not exist in a wafer front face. Then, the organic substance which remained in the wafer was analyzed.

[0057] Polish conditions: Used grinder STARSBAUGH and 6CA (diameter lower lapping plate of 20 inch)

Rotational-frequency-lower lapping plate: 115rpm, carrier plate: 100rpm pressurization pressure 400 g/cm² (per wafer unit area)

Polish slurry Thing use abrasive cloth which diluted Nalco2350 (made in Nalco Chemical Company (U.S.)) with pure water 20 times Suba600 (Rodel Nitta [CO.] CO. make)

Workpiece Diameter of 4 inch P (100) acid etched wafer D.TDS analysis was carried out according to the following methods.

[0058] TDS analysis used EDM-WA1000 (product made from electronic science).

[0059] TDS spectrum: The TDS spectrum was measured about M/z=1, and 2, 15, 16, 18, 28, 32 and 44. The programming rate was heated to 800 degrees C by part for 60-degree-C/.

[0060] M/z and the corresponding ion are as follows.

[0061]

[Table 3]

M/Zと対応するイオン

M/e	1	2	15	16	18	28	32	44
イオン	H	H ₂	CH ₃	CH ₄ O	H ₂ O	C ₂ H ₄ CO N ₂	O ₂ CH ₃ - OH	C ₃ H ₈ CO ₂

[0062] It asks for a peak area from a TDS spectrum, and the amount of desorption which broke by the weight of a sample and was standardized is shown in Table 4. Moreover, what graph-ized this is shown in drawing 1. Although these results show that the amount of desorption has increased a little by samples 1-6, it turns out that not a remarkable difference but a hold-back agent hardly remains in a wafer side.

[0063]

[Table 4]

各試料の脱離量 (a. u.) * の比較

試料 M/z	1	2	15	16	18	28	32	44
No. 1	553	2392	143	139	588	593	46	334
No. 2	451	2023	117	97	443	495	39	277
No. 3	462	2042	123	103	436	568	48	302
No. 4	463	1908	126	116	474	554	38	325
No. 5	474	2107	127	105	463	517	32	285
No. 6	497	1990	140	132	539	607	29	344
No. 7	490	1970	144	122	501	596	35	326

[0064]

[Effect of the Invention] Since the adhesiveness over the workpiece can be adjusted only by changing the temperature of a hold-back agent according to this invention, in case adhesion fixation can be carried out with high precision and stably at a grinder surface plate and a workpiece is exfoliated from a grinder surface plate by maintaining a hold-back agent at the state of having adhesiveness, and equipping a grinder surface plate with it, in case a workpiece is ground, it can be made to exfoliate easily from this grinder surface plate by cooling a hold-back agent. Thus, there are no contamination, etching, etc. by the organic solvent or the surfactant in a workpiece like before, and the result state of polish can be made good.

[Translation done.]